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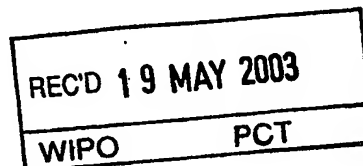
PCT/BE03/00055

Rec'd PCT/PTO 27 SEP 2004

# ROYAUME DE BELGIQUE

#2

MINISTRE DES AFFAIRES ECONOMIQUES  
ADMINISTRATION DE LA POLITIQUE COMMERCIALE



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Bruxelles, le 17. -4- 2003

Pour le Conseiller de l'Office  
de la Propriété industrielle

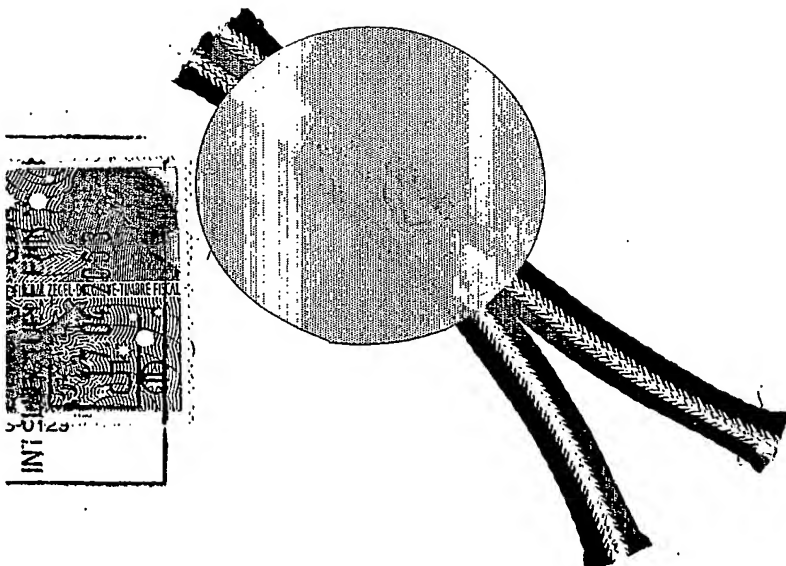
Le fonctionnaire délégué,

PETIT M.  
Conseiller adjoint

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PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/BE 02/00045

International Application No.

26 MAR 2002

International Filing Date

(26 -03- 2002)

RO/BE - PCT INTERNATIONAL APPLICATION

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) ORPC 131726

Box No. I TITLE OF INVENTION  
Non-lauric, low-trans filling and cream fats

Box No. II APPLICANT

☐ This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

FUJI OIL EUROPE  
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Telephone No.

Facsimile No.

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Applicant's registration No. with the Office

State (that is, country) of nationality:

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State (that is, country) of residence:

BE

This person is applicant  
for the purposes of:☐ all designated  
States☒ all designated States except  
the United States of America☐ the United States  
of America only☐ the States indicated in  
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

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This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box  
is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

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State (that is, country) of residence:

BE

This person is applicant  
for the purposes of:☐ all designated  
States☐ all designated States except  
the United States of America☒ the United States  
of America only☐ the States indicated in  
the Supplemental Box☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent☐ common  
representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

LUYS Marie-José  
GEVERS & VANDER HAEGHEN  
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32-2.535.99.11Facsimile No.  
32-2.535.99.00

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Sheet No. ...2...

## Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SAEY Karen  
 Stroelputstraat 42  
 B-8210 Veldegem  
 Belgium

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

BE

State (that is, country) of residence:

BE

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☒ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

VAN DYCK Marij  
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 B-9000 Gent  
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This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

BE

State (that is, country) of residence:

BE

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☒ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

## Box No. V DESIGNATION OF STATES

Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

## Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT .....
- ☒ EP European Patent: AT Austria, BE Belgium, CH & LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT .....
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....

## National Patent (if other kind of protection or treatment desired, specify on dotted line):

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates               | <input checked="" type="checkbox"/> GM Gambia                                    | <input checked="" type="checkbox"/> NZ New Zealand                 |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda                | <input checked="" type="checkbox"/> HR Croatia                                   | <input checked="" type="checkbox"/> OM Oman                        |
| <input checked="" type="checkbox"/> AL Albania                            | <input checked="" type="checkbox"/> HU Hungary                                   | <input checked="" type="checkbox"/> PH Philippines                 |
| <input checked="" type="checkbox"/> AM Armenia                            | <input checked="" type="checkbox"/> ID Indonesia                                 | <input checked="" type="checkbox"/> PL Poland                      |
| <input checked="" type="checkbox"/> AT Austria + utility model            | <input checked="" type="checkbox"/> IL Israel                                    | <input checked="" type="checkbox"/> PT Portugal                    |
| <input checked="" type="checkbox"/> AU Australia                          | <input checked="" type="checkbox"/> IN India                                     | <input checked="" type="checkbox"/> RO Romania                     |
| <input checked="" type="checkbox"/> AZ Azerbaijan                         | <input checked="" type="checkbox"/> IS Iceland                                   | <input checked="" type="checkbox"/> RU Russian Federation          |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina             | <input checked="" type="checkbox"/> JP Japan                                     | <input checked="" type="checkbox"/> SD Sudan                       |
| <input checked="" type="checkbox"/> BB Barbados                           | <input checked="" type="checkbox"/> KE Kenya                                     | <input checked="" type="checkbox"/> SE Sweden                      |
| <input checked="" type="checkbox"/> BG Bulgaria                           | <input checked="" type="checkbox"/> KG Kyrgyzstan                                | <input checked="" type="checkbox"/> SG Singapore                   |
| <input checked="" type="checkbox"/> BR Brazil                             | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea     | <input checked="" type="checkbox"/> SI Slovenia                    |
| <input checked="" type="checkbox"/> BY Belarus                            | <input checked="" type="checkbox"/> KR Republic of Korea                         | <input checked="" type="checkbox"/> SK Slovakia + utility model    |
| <input checked="" type="checkbox"/> BZ Belize                             | <input checked="" type="checkbox"/> KZ Kazakhstan                                | <input checked="" type="checkbox"/> SL Sierra Leone                |
| <input checked="" type="checkbox"/> CA Canada                             | <input checked="" type="checkbox"/> LC Saint Lucia                               | <input checked="" type="checkbox"/> TJ Tajikistan                  |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> LK Sri Lanka                                 | <input checked="" type="checkbox"/> TM Turkmenistan                |
| <input checked="" type="checkbox"/> CN China                              | <input checked="" type="checkbox"/> LR Liberia                                   | <input checked="" type="checkbox"/> TN Tunisia                     |
| <input checked="" type="checkbox"/> CO Colombia                           | <input checked="" type="checkbox"/> LS Lesotho                                   | <input checked="" type="checkbox"/> TR Turkey                      |
| <input checked="" type="checkbox"/> CR Costa Rica                         | <input checked="" type="checkbox"/> LT Lithuania                                 | <input checked="" type="checkbox"/> TT Trinidad and Tobago         |
| <input checked="" type="checkbox"/> CU Cuba                               | <input checked="" type="checkbox"/> LU Luxembourg                                | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> CZ Czech Republic + utility model     | <input checked="" type="checkbox"/> LV Latvia                                    | <input checked="" type="checkbox"/> UA Ukraine                     |
| <input checked="" type="checkbox"/> DE Germany + utility model            | <input checked="" type="checkbox"/> MA Morocco                                   | <input checked="" type="checkbox"/> UG Uganda                      |
| <input checked="" type="checkbox"/> DK Denmark + utility model            | <input checked="" type="checkbox"/> MD Republic of Moldova                       | <input checked="" type="checkbox"/> US United States of America    |
| <input checked="" type="checkbox"/> DM Dominica                           | <input checked="" type="checkbox"/> MG Madagascar                                | <input checked="" type="checkbox"/> UZ Uzbekistan                  |
| <input checked="" type="checkbox"/> DZ Algeria                            | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia | <input checked="" type="checkbox"/> VN Viet Nam                    |
| <input checked="" type="checkbox"/> EC Ecuador                            | <input checked="" type="checkbox"/> MN Mongolia                                  | <input checked="" type="checkbox"/> YU Yugoslavia                  |
| <input checked="" type="checkbox"/> EE Estonia + utility model            | <input checked="" type="checkbox"/> MW Malawi                                    | <input checked="" type="checkbox"/> ZA South Africa                |
| <input checked="" type="checkbox"/> ES Spain                              | <input checked="" type="checkbox"/> MX Mexico                                    | <input checked="" type="checkbox"/> ZM Zambia                      |
| <input checked="" type="checkbox"/> FI Finland + utility model            | <input checked="" type="checkbox"/> MZ Mozambique                                | <input checked="" type="checkbox"/> ZW Zimbabwe                    |
| <input checked="" type="checkbox"/> GB United Kingdom                     | <input checked="" type="checkbox"/> NO Norway                                    |  |
| <input checked="" type="checkbox"/> GD Grenada                            |  |  |
| <input checked="" type="checkbox"/> GE Georgia                            |  |  |
| <input checked="" type="checkbox"/> GH Ghana                              |  |  |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

☒ and any other state which is contracting state of the PCT at the date of the international filing ☐

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

**Supplemental Box** If the Supplemental Box is not used, this sheet should not be included in the request.

1. If, in any of the Boxes, except Boxes Nos. VIII(i) to (v) for which a special continuation box is provided, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ...." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:
  - (i) if more than two persons are to be indicated as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;
  - (ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;
  - (iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;
  - (iv) if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;
  - (v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;
  - (vi) if, in Box No. VI, there are more than five earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.
2. If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.

**CONTINUATION OF BOX N° IV  
ADDITIONAL AGENTS :**

Claeys Pierre, Gevers Florent, Gevers François, Gevers Jacques, Grisar Daniel, Luys Marie-José, Pieraerts Jacques, Quintelier Claude, Schmitz Yvon, Van Reet Joseph, Vosswinkel Philippe

**Professional address :** Gevers & Vander Haeghen  
Rue de Livourne, 7  
B-1060 Brussels, Belgium

**Telephone N° :**  
32 2 535 99 11  
**Fax N° :** 32 2 535 99 00

Sheet No. . . 5 . . .

**Box No. VI PRIORITY CLAIM**

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1)				
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items    ☐ item (1)    ☐ item (2)    ☐ item (3)    ☐ item (4)    ☐ item (5)    ☐ other, see Supplemental Box

\* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)): . . . .

**Box No. VII INTERNATIONAL SEARCHING AUTHORITY**

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / .....

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)                      Number                      Country (or regional Office)

**Box No. VIII DECLARATIONS**

The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of  
declarations

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Box No. VIII (i)   | Declaration as to the identity of the inventor   | : |
| <input type="checkbox"/> Box No. VIII (ii)  | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent             | : |
| <input type="checkbox"/> Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| <input type="checkbox"/> Box No. VIII (iv)  | Declaration of inventorship (only for the purposes of the designation of the United States of America)                               | : |
| <input type="checkbox"/> Box No. VIII (v)   | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty   | : |

**Box No. IX CHECK LIST; LANGUAGE OF FILING**

This international application contains:

(a) the following number of sheets in paper form:

request (including declaration sheets) : 6  
 description (excluding sequence listing part) : 22  
 claims : 2  
 abstract : 1  
 drawings : 0

Sub-total number of sheets : 31

sequence listing part of description (actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below) :

Total number of sheets : 31

(b) sequence listing part of description filed in computer readable form

- (i) ☐ only (under Section 801(a)(i))  
 (ii) ☐ in addition to being filed in paper form (under Section 801(a)(ii))

Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii), in right column):

This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):

- |   |   |   |
|---|---|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet  | : | 1 |
| 2. <input checked="" type="checkbox"/> original separate power of attorney  | : | 4 |
| 3. <input type="checkbox"/> original general power of attorney  | : |   |
| 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: .....  | : |   |
| 5. <input type="checkbox"/> statement explaining lack of signature  | : |   |
| 6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): .....   | : |   |
| 7. <input type="checkbox"/> translation of international application into (language): .....   | : |   |
| 8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material  | : |   |
| 9. <input type="checkbox"/> sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other))  | : |   |
| (i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application)   | : |   |
| (ii) <input type="checkbox"/> (only where check-box (b)(i) or (b)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter | : |   |
| (iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column  | : |   |
| 10. <input type="checkbox"/> other (specify): .....   | : |   |

Figure of the drawings which should accompany the abstract: —

Language of filing of the international application: English

**Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Antwerp, March 26, 2002



LUYS Marie-José

For receiving Office use only

1. Date of actual receipt of the purported international application:

26 MAR 2002 (26-03-2002)

3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:

4. Date of timely receipt of the required corrections under PCT Article 11(2):

5. International Searching Authority (if two or more are competent): ISA /

6. ☐ Transmittal of search copy delayed until search fee is paid

2. Drawings:

☐ received:☐ not received:

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

**Non-lauric, low-trans filling and cream fats.**

The present invention relates to a process for producing a fat composition suitable for use as a filling and/or cream fat, as described in the preamble of the first claim.

5 So-called filling and cream fats form an important application area in the confectionery fat industry. Filling and cream fats are used for the production of for example soft centres for pralines or confectionery bars or for creams used in or on biscuits or wafers. To be suitable for use as a cream and/or filling fat, it is important that the fat has specific properties such as good  
10 melting properties in the mouth, good creaminess as well as a stable crystal structure. Several types of fats are known which are capable of providing these properties.

A first class of fats suitable for use as filling and/or cream fats includes the so-called lauric fats. The lauric fats are derived from  
15 coconut oil or palm kernel oil and contain a high amount of lauric and myristic acid. By subjecting these fats to a fractionation and/or a hydrogenation reaction, a fat with a steep SFC-profile can be obtained, i.e. a fat of which the solid fat content (SFC) as a function of temperature is high at room temperature, whereas at body temperature the solid fat content is low and the fat is completely molten.  
20 This sharp transition from solid to liquid gives a cool sensation in the mouth. Besides showing a steep SFC-profile lauric fats show a quick solidification, which is an advantage when used in fillings and creams. Although they are frequently applied in practise, lauric type fats have a number of disadvantages, the first disadvantage being the risk to saponification of the lauric acid upon ageing,  
25 involving the occurrence of a very bad taste. A second disadvantage of lauric fats is their high saturated fatty acid content, often over 80%, which is considered as an important nutritional disadvantage.

A second class of cool melting filling and cream fats is based on fractionated palm oil. Palm oil as such shows a rather flat SFC-curve  
30 with a SFC at 20°C of only 25 %, while at 35°C the SFC is 6%. By subjecting palm



oil to a fractionation process a product with steep SFC-profile can be obtained. Fractionation of palm oil is carried out by cooling palm oil to a certain temperature, until a liquid phase containing triglycerides with a the lower melting point and a solid phase containing triglycerides with a higher melting point, is obtained.

5 Reduction of the tailing effect of the SFC curve is achieved by removing the high melting part, which mainly consists of trisaturated triglycerides like tripalmitine. Fats associated with this tailing cause a waxy feeling in the mouth upon eating. In a next stage, through removal of the part with the lower melting temperature, which mainly comprises tri- or di-unsaturated triglycerides like tri-oleine or 1-

10 palmitic 2-3-oleic triglycerides, the SFC at room temperature is increased. The fraction remaining after removal of the higher and lower melting part of the palm oil is commonly indicated by the name PMF (palm mid fraction).

The most important advantages of PMF-based filling and cream fats are their non-lauric nature, the lower content of saturated fatty

15 acids, the fresh melting sensation upon eating and the fact that PMF is a non-hydrogenated fat. A major disadvantage of PMF however resides in the rather long and laborious fractionation process involved, together with the rather low production yields, which renders the product expensive: starting from palm oil only 25-30 % of PMF is obtained. The yields of hard PMF obtained via double

20 fractionation are even lower. A further disadvantage is the slow solidification rate of PMF, which necessitates in the confectionery plant the use of devices with high cooling capacities. Besides this, PMF based fats show a risk to re-crystallisation, causing "graininess" of the final product when stored for some time, in particular in case no tempering is applied.

25 A third type of filling and cream fats is based on hydrogenated liquid oils or hydrogenated olein fractions. This type of fat compositions is characterised by a good creaminess and good melting properties, although they may show less cooling sensation in the mouth, which is typical for the two previous types of fat compositions. Products containing these fats show a

30 quick solidification and a stable texture. In addition to this, hydrogenated liquid oils and olein fractions are less expensive compared to the former products since their raw materials are largely available and their processing is less complicated as compared to palm oil fractionation. The presence of trans fatty acids entails the advantage of improving the crystallisation rate. The big disadvantage of

hydrogenated liquid oils and olein fractions however is their too high content of trans fatty acids (TFA), which is a health concern of increasing importance. In fact, trans fatty acids are unsaturated fatty acids. However, they have undesirable effects comparable to or even worse than saturated fatty acids (SFA). This is why  
5 there is an interest to not only control the SFA level of a fat composition, but to control also the sum of the TFA and SFA levels. To get products with steep SFC-profiles, the hydrogenation reaction is mostly carried out in the presence of a trans-specific catalyst, for example S-poisoned Ni-catalysts.

From the above, it will become clear that there is a  
10 need to a fat composition suitable for use as a filling and/or cream fat and to a method for producing such a fat composition. There is a need to a fat composition which preferably is non-lauric, which is characterised by a good melting in the mouth without involving waxiness, which shows a sufficiently high crystallisation rate and has an interesting nutritional profile, which means that the composition  
15 should have a low content of both saturated and trans fatty acids. Furthermore it is of interest that the fat composition may be produced at an acceptable cost.

Another type of fat compositions widely used in confectionery fats includes the so-called hard butters, which are used for the production of tablets or coatings. Hard butters are characterised by a steep SFC-profile: they have a high solid fat content and are hard at room temperature. At  
20 body temperature they melt and their solid fat content becomes negligible. The SFC profile of these confectionery fats is similar to that of cocoa butter, which is the traditional chocolate fat.

Over the years, three main classes of hard butters  
25 have been developed, including (i) lauric cocoa butter substitutes, (ii) cocoa butter equivalents (CBE) containing palm oil fractions combined with so-called wild fats like illipe or shea fat, and (iii) non-lauric cocoa butter replacers (NL-CBR) based on trans-specific hydrogenated liquid oils or liquid fractions. These three classes of cocoa butter alternatives correspond to the three classes of filling fats  
30 described above.

In general, fillings and creams will be softer than tablets and coatings. The reasons for this higher softness resides in the higher fat content and in the softer nature of the fats contained in the fillings and creams, i.e. the lower SFC at room temperature. However, it is also important to the filling and

cream fats to have a steep SFC-profile, which means that at room temperature the SFC should be sufficiently high, whereas at body temperature the SFC should be low, in order to avoid a "waxy" mouthfeel. This explains the similar approach used in the production of filling/cream fats and the so-called hard butters, mentioned above.

Palm fractions used for CBE are typically obtained by wet fractionation, which gives a PMF of better quality as compared to PMF obtained from dry or detergent fractionation, the wet fractionation process however being the more expensive one. In the wet fractionation process use is made of acetone, hexane or any other suitable solvent. The wet fractionation process guarantees a sharp fractionation, with an efficient removal of low melting triglycerides like POO (P = Palmitic acid; O = Oleic acid) and high melting triglycerides like PPP. The wet fractionation is also an efficient process for removing diglycerides from the palm mid fraction, which are to be avoided in CBE products.

The production of non-lauric CBR is described by W. Soon in "Specialty fats versus Cocoa Butter" page 189-192. According to W. Soon, liquid oils like soybean oil, rapeseed oil and sunflower oil are suitable raw materials for a hydrogenation process, as well as liquid fractions like highly fractionated palm olein (iodine value > 68). However, according to W. Soon, care needs to be taken to carry out the hydrogenation process in such a way as to minimise the production of trisaturated triglycerides (SSS where S = Saturated), as these have a high melting point and induce waxiness. This may be achieved by appropriate selection of the catalyst. Instead of using a conventional catalyst, W. Soon advises to carry out the hydrogenation reaction in the presence of a sulphur poisoned nickel catalyst as this promotes the formation of trans-isomers, which give a steep SFC-profile, while formation of SSS isomers is minimised. To produce non-lauric CBR based on palm oil, it is advisable to have use as a starting material a palm olein the PPP and PPO/POP content of which is as low as possible. PPP is a trisaturated fatty acid that is naturally present in palm oil. With PPO and POP saturation of one single fatty acid suffices to build trisaturated fatty acids.

The effect of using a sulphur poisoned Ni-catalyst in a hydrogenation reaction of palm olein in stead of a traditional non trans specific

Ni-catalyst on palm olein has been described by H. Mori in "Crystallisation and polymorphism of fats and fatty acids" pg 430-431. According to Mori, when using a trans specific catalyst a confectionary fat with a sharp melting curve is obtained, which is not the case when hydrogenating palm olein in the presence of a conventional hydrogenation catalyst.

From EP-A-547.651 it is known to use a blend of (i) a non lauric fat, in particular a mid-fraction obtained from wet fractionation of hardened soybean oil containing fat mixtures; and (ii) a liquid, trans-hardened high stability oil, in particular olein fractions obtainable from wet fractionation of hardened soybean oil containing fat mixtures. Thereto, combinations of soybeanoil and palm oil olein are subjected to a trans-selective hydrogenation reaction. In the wet fractionation preferably acetone is used as a solvent, for the trans-selective hydrogenation a sulphided Ni-catalyst is found very suitable. The blends of mid-fractions and olein-fractions of such trans-hydrogenated combinations give filling fats with a minimised waxiness, a steep melting curve and, a steep SFC-profile with N20 > 40 % and N30 < 8 %, and good mouthfeel. However, the trans fatty acid content of these fat composition ranges from 35 to 45%, which is too high.

US-A-4.205.095 relates to a method for the production of cocoa butter substitutes, according to which a palm mid fraction is subjected to a catalytic hydrogenation reaction in the presence of a nickel, platinum or palladium catalyst. The purpose of the hydrogenation reaction is to extend the possibilities of blending PMF with cacao butter by removing triglycerides containing more than one unsaturated fatty acid (SU<sub>2</sub> and U<sub>3</sub>) as much as possible and by converting polyunsaturated hydrocarbon chains of the fatty acids into mono-unsaturated hydrocarbon chains, thereby reducing the iodine value to 38-45, the linoleic acid content to below 2 % and achieving a fat composition with a melting point of between 33-36°C.

It is the object of the present invention to provide a fat composition for use as a filling and/or cream fat, which is non-lauric, which is characterised by a steep SFC-profile, a good melting in the mouth without involving waxiness, which shows a sufficiently high crystallisation speed, has an interesting nutritional profile, i.e. has a low content of trans fatty acids and does

not contain too much saturated fatty acids, and which may be produced at an acceptable cost, with respect to raw material cost, process cost, yields,...

We have now found that such filling and cream fats can be obtained if use is made of a fat composition obtained by subjecting a first fat composition containing a palm oil or a palm oil fraction, the first fat composition being characterised by

(1) a glyceride composition with

- a  $S_2U$  content between 47 and 75 wt. %
- a  $SU_2 + U_3$  content < 40 wt. %
- a  $S_3$  content between 1 and 15 wt. %
- a diglyceride content of 3 to 12 wt. %

the glyceride contents being expressed as wt. % with respect to the total amount of di-and triglycerides

(2) and a total content of unsaturated fatty acids of less than 55 wt. %, preferably less than 50 wt. %, more preferably less than 48 wt. %

to a catalytic hydrogenation until a product is obtained which is characterised by a trans fatty acid (TFA) content of less than 13 wt. %, preferably less than 10 wt. %, more preferably less than 5 wt. %, and by an increase of C18-0 of less than 1 wt. %, preferably less than 0.7 wt. %, more preferably less than 0.4 wt. %.

In the above, S means saturated fatty acid with a hydrocarbon chain length of 16-24 carbon atoms, and U means unsaturated fatty acid with a hydrocarbon chain length of 16-24 carbon atoms.

In the process of this invention for the first fat composition preferably use is made of a palm oil, a palm oil fraction or blends containing high amounts of palm oil preferably > 70 wt. %.

First fat compositions of particular interest for use in filling and cream fats are characterised by

(1) a glyceride composition with

- a  $S_2U$  content of between 50-70 wt. %, preferably 53-65 wt. %
- a  $SU_2 + U_3$  content of between 15-35 wt. %, preferably 20-32 wt. %
- a  $S_3$  content of between 1.5 and 12 wt. %, preferably 2-10 wt. %, most preferably 2.5-7 wt. %

(2) and a total content of unsaturated fatty acids of < 55 wt. %, preferably < 50 wt. %, more preferably < 48 wt. %.

The product obtained from the fractionation process shows a steeper SFC-curve than palm oil, which as such is a suitable raw material for the fractionation, but its crystallisation is still too slow. To improve the crystallisation rate and achieve a product with a steeper SFC, the fractionated material is subjected to a hydrogenation reaction as described above, to obtain a fat composition with the above-described properties.

The triglyceride compositions obtainable with the method of this invention have a higher content of high melting triglycerides, low melting triglycerides and diglycerides as compared to a traditional high quality PMF. This means in fact that with the process of the present invention, fat compositions may be obtained that are suitable for use as filling and/or cream fats, without involving the need to specifically select a high quality palm oil. Moreover, the fractionation process used does not imply severe requirements in terms of clean separation of olein and stearin fractions. In fact, in the process of this invention preferably use is made of a dry fractionation in stead of wet fractionation, although the latter is known to have a better separation efficiency. All these factors are in favour of obtaining a filling fat with the desired properties at an acceptable cost.

The fact that a fat composition with the above-described composition and properties may be obtained is surprising in view of the teaching by W. Soon. According to this teaching a fat composition containing a high amount of  $SU_2$  (eg. POO) in combination with a certain amount of  $S_3$  and a high amount of  $S_2U$  (eg. POP/PPO) easily builds high melting triglycerides upon hydrogenation. This leads to a product showing waxiness. The inventor has now found that starting from a fractionated product with the above described glyceride composition which contains a significant amount of  $SU_2$  and a high amount of  $S_2U$ , a fat composition with the desired properties may be obtained with a very slight hydrogenation, without or with only negligible building of trisaturated triglycerides upon hydrogenation. This result was found, irrespective of the fact whether the hydrogenation reaction was carried out in the presence of a trans specific or a non-trans specific hydrogenation catalyst.

The inventor has also observed that in the course of the hydrogenation reaction, the formation of trans fatty acids remained within acceptable limits, often negligible.

The hydrogenation reaction will preferably be continued until a product is obtained with an iodine value that differs from the iodine value of the product before hydrogenation by a value of less than 10, preferably less than 5.

5 The catalyst used in the hydrogenation reaction of this invention may be any catalyst known to the man skilled in the art, for example nickel, platinum or palladium based catalyst. Preferably however use is made of a Ni-containing hydrogenation catalyst, which is not trans-specific or sulphur poisoned, to limit the formation of trans fatty acids in the course of the  
10 hydrogenation reaction as much as possible. Contrary to what could be expected from the teaching of W. Soon and H. Mori, the use of non trans specific catalyst does not result in less steep SFC-profiles, higher melting points or stronger waxiness, provided the raw material for hydrogenation corresponds with the above described triglyceride ranges.

15 It is furthermore preferred to carry out the hydrogenation reaction at a temperature of between 160-225°C, as in this range the hydrogenation rate is acceptable and simultaneously the risk to the formation of trans fatty acids and saturated fatty acids being limited.

The fat composition obtainable with the process of  
20 this invention is characterised by a steep SFC-profile. In fact the difference in SFC value at 20°C and 35°C is higher than 35 %, preferably more than 40 %, the SFC being measured according to IUPAC method 2.150 a.

The fat composition obtainable with the process of this invention is further characterised by a crystallisation time at 15°C of less than  
25 15' to reach 50% of the SFC measured at 15°C.

If so desired, the above-described fat composition may be blended with a second fat composition. Thereto, 1-100 % of the first fractionated, hydrogenated fat may be blended with 99 -0 % of a second fat composition having a TFA-content of less than 10 %, preferably less than 5 %. To  
30 limit the trans fatty acid content as well as the saturated fatty acid content of the fat composition, the second fat composition is preferably a non-hydrogenated fat.

The second fat composition preferably has an SFC at 30°C of less than 7% and at 35°C of less than 4%, as this allows minimising tailing and thus waxiness of the product. Preferred examples of fat compositions

suitable for use as the second fat composition include palm fractions or liquid oils. Most preferably, the second fat composition is a palm fraction with an IV of > 40, preferably > 45, most preferably > 50.

5 Other examples of fats suitable for use as the second fat composition include olein fractions removed in the above mentioned fractionation process. The stearin fraction obtained after fractionation is slightly hydrogenated as described above, after which part of the olein is added again to the hydrogenated stearin. In that way, starting from a palm oil containing starting material, a fat composition may be obtained with good yield, good melting in the mouth, maintaining a sufficiently high crystallisation speed and with a low TFA-  
10 content.

The invention is further illustrated in the examples and comparative examples given below.

15 Comparative example A.

A palm oil was dry fractionated into (1) a stearin fraction with an iodine value of 35, and (2) an olein fraction with an iodine value (IV) of 56. The olein fraction yield was 81%. The olein fraction was further dry fractionated into a second stearin fraction and a second olein fraction with IV-  
20 value 64.1. The olein yield was 49.9%, when calculated with respect to the original palm oil. The solid fat content (SFC), fatty acid composition (FAC) and triglyceride composition of the thus obtained olein fraction is given in table 1.

To obtain a fat composition with a steep SFC-profile, the olein was subsequently hydrogenated. Two different catalysts were tested, a  
25 non-specific and a trans-specific nickel catalyst, respectively the Pricat 9910 and Pricat 9908 (Synetix). The conditions in which the hydrogenation reaction was carried out, are described in table 2. The SFC and FAC of the hydrogenated olein fractions are given in table 1.

As can be seen from table 1, hydrogenation with a  
30 trans-specific catalyst (Pricat 9908) gives an olein fraction with a steeper SFC profile as compared to the olein fraction hydrogenated in the presence of the non-specific catalyst (Pricat 9910), which renders the hydrogenated product more suitable for use in filling or cream fat applications. The results of this comparative



example are completely in line with the observations by Mori in earlier mentioned literature.

Table 1

5

Product	Start	hydrogenated	hydrogenated
	Palm Olein	Palm Olein n°1	Palm Olein n°2
<b>IV</b>	64,1	56,5	51,1
<b>FAC</b>			
C12	0,32	0,32	0,30
C14	1,02	1,00	1,00
C16	33,93	33,79	33,50
C18	4,09	4,34	5,06
C18-1	45,73	52,40	56,90
C18-2	14,05	4,94	1,38
C18-3	0,17	0,00	0,00
C 20	0,34	0,38	0,35
<b>TFA</b>	0,86	27,85	15,84
<b>SFA</b>	39,70	39,83	40,21
<b>TFA+SFA</b>	40,56	67,68	56,05
<b>Triglycerides</b>			
S2U	30,80		
SU2+U3	52,13		
S3	0,33		
<b>Diglycerides</b>	7,95		
<b>SFC</b>			
10°C	0,8	72,0	65,5
20°C	0,0	43,3	35,4
25°C	0,0	26,5	22,0
30°C	0,0	14,4	11,8
35°C	0,0	3,5	3,6

Table 2

Sample nr	nr 1	nr 2
Amount of fat (kg)	1,5	1,5
catalyst type	Synetix 9908	Synetix 9910
catalyst amount	0,4	0,10%
Reaction-T (°C)	180-200	180-200
Reaction-P (Bar)	0,75	0,2
Mixer speed (rpm)	1200	1000
H2-consumption (L)	8	13,5

Example 1.

A palm oil was dry fractionated into a first stearin fraction with an IV of 34.4 and a first olein fraction with an IV of 55.4. The olein yield was 84 %. Thereafter, the olein fraction was further dry fractionated into a second stearin fraction with an IV 44.9 and a second olein fraction with an IV-value of 63.1. The SFC, FAC and triglyceride-content of the stearin fraction is summarised in table 3. The yield of the second stearin fraction as calculated from the original palm oil is 36.1 %. The crystallisation rate of the second stearin fraction is given in table 5.

To obtain a fat with steeper SFC-profile, a better heat resistance and a better crystallisation rate, the thus obtained stearin fraction was hydrogenated, in the presence of the catalysts of comparative example A, i.e. the trans-specific nickel catalyst the Pricat 9908 (sample 3) and the non-specific catalyst Pricat 9910 (sample 4). The hydrogenation conditions are given in table 4, SFC and FAC of the hydrogenated products are given in table 3, solidification rates are given in table 5.

From the results of table 3 it can be seen that sample 3 which had been hydrogenated with a trans-specific catalyst did not show a steeper SFC-profile as compared to sample 4 which had been hydrogenated in the presence of a non-specific catalyst. This result was unexpected in view of the teaching by Mori and comparative example A. From table 3 it further appears that the use of a non-specific catalyst does not give rise to a fat composition with more tailing, which would be unwanted as this creates waxiness. In fact, the characteristics of the fat after fractionation were such that, after a slight hydrogenation the desired properties in terms of SFC and crystallisation rate could

be obtained, the formation of unwanted amounts of saturated fatty acids being limited as well as the building of additional amounts of trisaturates. Also both fat compositions, obtained through hydrogenation in the presence of either one of the two catalyst showed similar solidification speeds.

5 Both samples 3 and 4 are suitable for use in in a filling or a cream. However the fat composition hydrogenated with the non-specific catalyst has the advantage of showing a lower TFA-content, the sum of TFA and SFA also being lower.

10 Table 3

Product	Start 2nd stearin	Nr 3	Nr 4
<b>IV</b>	44,9	42,6	39,9
<b>FAC</b>			
C12	0,33	0,26	0,25
C14	1,34	1,17	1,17
C16	51,29	50,84	51,36
C18	4,64	4,85	4,73
C18-1	34,87	37,10	38,62
C18-2	6,95	5,05	3,23
C18-3	0,00	0,00	0,00
C 20	0,36	0,31	0,33
<b>TFA</b>	0,42	7,15	4,25
<b>SFA</b>	57,96	57,43	57,84
<b>TFA+SFA</b>	58,38	64,58	62,09
<b>Triglycerides</b>			
S2U	63,63		
SU2+U3	23,98		
S3	4,46		
<b>Diglycerides</b>	5,50		
<b>SFC</b>			
10°C	71,9	80,4	82,0
20°C	43,4	58,4	61,0
25°C	19,7	37,1	38,8
30°C	9,2	20,5	20,8
35°C	3,8	9,5	9,7

Table 4

Sample nr	nr 3	nr 4
Amount of fat (kg)	1,5	1,5
catalyst type	Synetix 9908	Synetix 9910
catalyst amount	0,3	0,10%
Reaction-T (°C)	200	200
Reaction-P (Bar)	0,2	0,2
Mixer speed (rpm)	1000	1000
H <sub>2</sub> -consumption (L)	1,25	4,5

Table 5

Time	SFC (*)		
	Start product	Sample Nr 3	Sample Nr 4
2,5'	10,8	17,5	16,6
5'	12,1	24,9	21,5
7,5'	12,6	33,1	28,1
10'	13,2	40,9	35,1
15'	17,2	50,6	46,9

(\*) SFC after complete melting at 80°C and cooling in water bath at 15°C

#### Comparative example B.

A palm oil was dry fractionated to give a first stearin fraction with an IV of 35 and a first olein fraction with an IV of 56. The first olein fraction yield was 81%. The first olein fraction was further dry fractionated into a second stearin fraction with an IV of 45.2 and a second olein fraction. This second stearin fraction corresponds to a palm mid fraction (PMF) with an SFC and FAC as indicated in table 6, sample 5.

The PMF yield with respect to the original palm oil was 28.9%. As can be seen from table 6, the SFC profile of this PMF is sharper as compared to the SFC-profile of samples 3 and 4, thus rendering the PMF fraction especially suitable for use in cream or filling fats. However the fat of sample 5 has a very slow crystallisation speed (table 7), and it is more expensive since the yield of this fraction on the original palm oil is very low. The TFA-content was negligible.

To improve the crystallisation speed 30% of the first stearin fraction was added to 70% of the PMF fraction again (sample 6, table 7).

This addition had the effect that the SFC-profile became less sharp (see table 6, sample 6). The SFC of sample 6 is comparable to the SFC of sample 1 of comparative example A, except for the somewhat more expressed tailing at 35°C for the non-hydrogenated product.

- 5 Combining of the first stearin fraction with the palm mid fraction, the yield with respect to the original palm oil, improved to 41.3%.

Table 6 .

Product	Nr 5	Nr 6
	PMF	
IV	45,2	42,24
FAC		
C12	0,31	0,26
C14	1,18	1,14
C16	48,20	50,62
C18	4,60	4,88
C18-1	37,40	35,31
C18-2	7,70	7,06
C18-3	0,00	0,00
C 20	0,32	0,38
TFA	0,14	0,43
SFA	54,61	57,28
TFA+SFA	54,75	57,71
Triglycerides		
S2U	69,30	
SU2+U3	23,90	
S3	0,90	
Diglycerides	4,13	
SFC		
10°C	69,4	71,5
20°C	34,4	46,0
25°C	3,7	24,3
30°C	0,0	14,3
35°C	0,0	7,7

Table 7.

Time	SFC (*)	
	Sample nr. 5	Sample nr. 6
2,5'	0	14,4
5'	1,5	15,7
7,5'	2,3	16,2
10'	2,3	17,6
15'	2,6	22,9

(\*) SFC after complete melting at 80°C and cooling in a water bath at 15°C

### 5 Example 2.

Fat compositions of sample 1, 4 and 6 were used to make the following blends :

blend 1 : 100% fat sample 1

blend 2 : 80% fat sample 4 + 20% Palm Olein with an IV of 63.1

10 blend 3 : 100% fat sample 6

The palm olein that was added in blend 2 to fat sample 4, was the second olein obtained in the preparation of sample 4 of example 1.

These blends showed the following properties:

15

Table 8

	Blend 1	Blend 2	Blend 3
<b>SFC</b>			
10°C	72,0	71,5	71,5
20°C	43,3	45,6	46,0
25°C	26,5	25,3	24,3
30°C	14,4	13,0	14,3
35°C	3,5	5,2	7,7
<b>Crystallisation speed at 15°C</b>			
2,5'	17,5	12,2	14,4
5'	30,0	14,9	15,7
7,5'	35,6	19,2	16,2
10'	39,1	24,6	17,6
15'	43,4	32,9	22,9
<b>TFA</b>	27,9	3,6	0,4
<b>SFA+TFA</b>	67,7	57,9	57,7
<b>Yield</b>	49,9	45,1	41,3

Blends 1-3 were used for the preparation of fillings according to the recipe of table 9 and the following procedure. All dry ingredients were weighed and mixed with part of the molten fat to obtain a kind of "dough". The "dough" had a fat content of 25%. 0.4 % of the lecithin was added from the beginning. The dough was passed over a roll refiner to reduce the particle size to 15-20 micron, and homogenised with the remainder of the fat in a mixer with hot jacket for 1 hour. After removing the dough from the mixer, it was cooled to 40°C and poured into alumina cups. No tempering was applied. The cups were immediately inserted in a cooling device at 12°C for 30', followed by cooling for another 30' at 15°C. The cups were stored at 20°C.

In the course of the preparation of the dough it was observed that the viscosity and pourability of the different fillings when filling the cups, was virtually the same. All fillings completely solidified after 30' at 12°C.

After storing for 2 weeks at 20°C, the thus obtained fillings were evaluated by a taste panel of 8 persons. For different characteristics a taste score was given from 0 to 4, the score 0 indicating that the characteristic was not present, the score 4 indicating that the characteristic was strongly present. The results are summarised in table 10.

A similar evaluation of the fillings was done after storing for 4 and 8 weeks at 20°C. In the evaluation after 8 weeks, the taste panel was asked which filling they preferred. The results are summarised in table 10.

Table 9

Sugar	42,9
Cocoa powder	9,9
Skimmed milk powder	4,3
Fat	42,9
lecithin	0,4
vanillin	0,1

Table 10

	Blend 1	Blend 2	Blend 3
<b><u>After 2 weeks</u></b>			
Good mouthfeel	2,4	2,5	1,6
Waxiness	1,4	1,5	2,8
Graininess	0	0	0
<b><u>After 4 weeks</u></b>			
Good mouthfeel	2,9	2,8	1,9
Waxiness	1,1	1,5	2,3
Graininess	0	0,1	0
<b><u>After 8 weeks</u></b>			
Good mouthfeel	2,4	3	1,8
Waxiness	1,1	0,8	2,3
Graininess	0,1	0,1	0,1
Best	1x	8x	0x

An evaluation of the results of table 10 learns that :

- The characteristics of Blend 2, which is a fat composition according to the invention and has a low trans fatty acid content, are comparable to or even better than Blend 1, which has a higher trans fatty acid content. The scores for blend 1 and 2 after 2 and 4 weeks are almost equal; after 8 weeks blend 2 gets even the best score in terms of mouthfeel and waxiness; 7 of the 8 evaluators preferred sample 2 as the best one, 1 evaluator gave an ex aequo to sample 1 and 2. This good result was unexpected.
- Blend 3 containing the fat composition of sample 6 which contained virtually no trans fatty acids, gives a much more waxy feeling and a less good melting in the mouth.

Each of the above tested blends consists of fractions of palm oil, which were hydrogenated or not hydrogenated after having been subjected to a fractionation. The yield of these blends with respect to the original palm oil, the TFA-content as well as the sum of TFA + SFA expressed, are given in table 8.

The results of table 8 indicate that blend 2 according to the invention, may be obtained with a good yield, shows a very low TFA content and a low content of TFA + SFA. Blend 2 did not require the use of a trans-specific catalyst in the hydrogenation reaction to obtain the required characteristics. Blend 2 learns that first removing an olein fraction, followed by



hydrogenation of the thus obtained stearin fraction, partial recombination of the olein fraction with the partially hydrogenated stearin fraction gives a fat composition with an interesting SFC-profile, a lower TFA and SFA content and an improved yield. Blend nr 2 was a cream or filling fat of good quality, with a good crystallisation rate and a good nutritional profile, which can be obtained at a reasonable cost. This was the objective of this invention.

Blend 1 is a traditional approach based on a hydrogenated palm olein fraction. To obtain the desired characteristics for Blend 1, it was necessary to carry out the hydrogenation reaction in the presence of a trans specific catalyst, which adversely affected the TFA and TFA+SFA content.

Blend 3 was an attempt to make a "trans fatty acid free" fat composition starting from a palm mid fraction. No hydrogenation at all was done. Although the starting product had a steep SFC-curve, its crystallisation rate was too slow and of a low yield, rendering the product expensive.

To overcome these disadvantages an amount of a stearin fraction was added to the palm mid fraction. The product yield and crystallisation rate could be improved, although the latter remained clearly lower than with blends 1 and 2. Moreover, a new problem was created being the waxiness of the final product. From a nutritional point of view, this blend cannot be considered better than blend 2 because of its higher saturated fatty acid content and because the sum of TFA and SFA is approximately the same for product 3 and product 2.

### Example 3.

Starting from palm oil, a palm mid fraction was produced by subjecting the palm oil to a fractionation and removing a first stearin fraction and a first olein fraction. The properties of the palm mid fraction (sample 7) are given in table 11, the crystallisation rate is given in table 13. The yield with respect to palm oil was 48.2%, which is much better than the PMF yield of comparative example 2 (sample 5).

To obtain a product with a steeper SFC profile and an improved crystallisation rate, the PMF of sample 7 was slightly hydrogenated with a non-specific catalyst and a trans-specific catalyst. The hydrogenation

conditions are given in table 12. Attempts were done to keep the TFA content as low as possible.

5 The properties of the thus obtained products are summarised in table 11 and 13 (sample 8 & 9). Hydrogenated samples 8 and 9 have almost the same SFC and the same crystallisation rate, although sample 9 had a lower TFA-content as the hydrogenation reaction was carried out in the presence of a non-specific hydrogenation catalyst. This confirms the observations made in example 1: the fat composition obtained by hydrogenation in the presence of a non-trans specific catalyst has a SFC profile with the same steepness and does not show more "tailing" than the product obtained with the trans-specific catalyst. This was not expected from the state of the art.

10 The two fat compositions 8 & 9 were evaluated for their performance in a cream. The recipe for producing the cream is given in table 14. The same procedure was applied as in example 2. Sample 8 and 9 showed virtually the same behaviour when preparing the creams.

15 The creams were stored for respectively 1 and 6 weeks and evaluated. A test panel was asked to indicate which one of the samples stored for 6 weeks, they preferred. The results are given in table 15.

Table 11

Product	Nr 7 Mid Fraction	Nr 8 Hydr Mid Frac	Nr 9 Hydr Mid Frac
IV	48,0	46,9	45,1
FAC			
C12	0,24	0,24	0,23
C14	1,08	1,10	1,07
C16	46,49	46,99	46,64
C18	4,74	4,83	4,76
C18-1	38,21	39,29	41,61
C18-2	8,60	6,58	5,12
C18-3	0,08	0,00	0,00
C 20	0,32	0,32	0,32
TFA	1,06	6,29	3,65
SFA	52,87	53,48	53,02
TFA+SFA	53,93	59,77	56,67
Triglycerides			
S2U	55,10		
SU2+U3	30,20		
S3	4,80		
Diglycerides	5,95		
SFC			
10°C	61,5	68,7	69,5
15°C	48,6	59,4	59,5
20°C	32,4	42,2	42,9
25°C	15,2	24,8	24,7
30°C	7,8	13,5	13,1
35°C	3,7	6,5	6,2

5 Table 12

Sample nr	nr 8	nr 9
Amount of fat (kg)	1,5	1,5
catalyst type	Synetix 9908	Synetix 9910
catalyst amount	0,3	0,10%
Reaction-T (°C)	200	200
Reaction-P( Bar)	0,2	0,2
Mixer speed (rpm)	1000	1000
H2-consumption (L)	0,85	3,50

Table 13

Time	SFC (*)		
	Sample nr. 7	Sample nr. 8	Sample nr. 9
2,5'	9,2	13,3	13,3
5'	10,1	15,4	15,8
7,5'	10,7	17,7	18,7
10'	11,9	22,4	24,0
15'	18,1	32,5	33,2

(\*) SFC after complete melting at 80°C and cooling in a water bath at 15°C

5

Table 14

Sugar	49,5
Skimmed milk powder	15,0
Fat	35,0
lecithin	0,5

Table 15

Evaluation of the cream		
	Sample nr. 8	Sample nr. 9
<b><u>Taste evaluation</u></b>		
<b>After 1 week</b>		
Good mouthfeel	2,6	2,5
Waxyiness	1,2	1,1
Grainyness	0,1	0
<b>After 6 weeks</b>		
Good mouthfeel	2,5	2,6
Waxyiness	1,5	1,3
Grainyness	0,3	0,1
Best	4x	4x

10

15

The results of table 15 show that the creams made with the blend 8 and 9 are equivalent. In both cases a cream with an acceptable mouthfeel, good crystallisation rate and low TFA-content could be obtained. The product with the trans-specific catalyst did not show better sharper melting properties in the mouth. In both cases the product yield with respect to the palm oil was satisfactory which was the objective of the invention. The fat composition of sample 9 produced with a non-trans selective catalyst, has the additional

advantage of a very low TFA-content, without being inferior on one of the other characteristics that were judged as important for this application.

## CLAIMS

1. A process for the production of a fat composition for confectionery filling and/or cream fats, characterised in that the fat composition comprises a first fat composition, the first fat composition containing palm oil or a palm oil fraction and having the following composition

(1) a glyceride composition with

- a  $S_2U$  content between 47 and 75 wt. %
- a  $SU_2 + U_3$  content < 40 wt. %
- a  $S_3$  content between 1 and 15 wt. %, /
- a diglyceride content of 3 to 12 wt. %

the glyceride contents being expressed as wt. % with respect to the total amount of di-and triglycerides

in which S means a saturated fatty acid with a hydrocarbon chain length of 16-24 carbon atoms and U means unsaturated fatty acid with a hydrocarbon chain length of 16-24 carbon atoms and

(2) a total content of unsaturated fatty acids of less than 55 wt. %, preferably less than 50 wt. %, more preferably less than 48 wt. %,

and in which the first fat composition is subjected to a catalytic hydrogenation to obtain a first fat composition with a trans fatty acid content < 13 wt. %, preferably < 10 wt. %, most preferably < 5 wt. % and an increase of C18-0 of less than 1 wt. %, preferably less than 0.7 wt. %, more preferably less than 0.4 wt. %.

2. The process of claim 1, characterised in that the first fat composition before hydrogenation has a glyceride composition with

1. a  $S_2U$  content between 50-70 wt. %, preferably between 53-65 wt. %, /
2. a  $SU_2 + U_3$  content between 15- 35 wt. %, preferably between 20-32 wt. %
3. a  $S_3$  content of between 1.5 and 12 wt. %, preferably 2 and 10 wt. %, most preferably between 2.5-7 wt. %.

3. The process of claim 1 or 2, characterised in that in the first fat composition is obtained through a fractionation step, the fractionation being either a dry fractionation or detergent fractionation.

4. The process of any one of claims 1-3 characterised in that the hydrogenation step is carried out until a fat composition is obtained with a difference in iodine value before and after hydrogenation of less than 10, preferably less than 5.

5. The process of any one of claims 1-4, characterised in that the hydrogenation reaction is carried out in the presence of a Ni-containing hydrogenation catalyst, which is not trans-specific.

6. The process of any one of claims 1-5, characterised in that the hydrogenation reaction is carried out at a temperature between 160-225°C.

7. A fat composition obtainable with the method of any one of claims 1-6, characterised in that the fat composition has a difference in SFC at 20°C versus 35°C of more than 35%, preferably more than 40%, the SFC being measured according to IUPAC method 2.150 a.

8. A fat composition as claimed in claim 7, characterised in that it has a crystallisation time at 15°C of less than 15' to reach 50% of the SFC measured at 15°C.

9. A fat composition as claimed in claim 7 or 8, characterised in that the composition contains 1-100 wt% of the first fat composition and 99-0% of a second fat composition, the second fat composition having a trans fatty acid content of less than 10 wt. %, preferably less than 5 wt. %.

10. A fat composition as claimed in claim 9, characterised in that the second fat B is a non-hydrogenated fat.

11. A fat composition as claimed in claim 9 or 10, characterised in that the second fat composition has an SFC at 30°C of less than 7% and at 35°C of less than 4%.

12. A fat composition as claimed in any one of claims 9-11, characterised in that the second fat B is a palm fraction or a liquid oil.

13. A fat composition as claimed in any one of claims 9-12, characterised in that the second fat composition is a palm fraction with an iodine value above 40, preferably > 45, most preferably > 50.

14. A confectionery product containing the fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-13.

15. A confectionery product as claimed in claim 14, characterised in that the confectionery product is a filling or a cream.

**ABSTRACT.****Non-lauric, low-trans filling and cream fats.**

The present invention relates to a process for the production of a fat composition for confectionery filling and/or cream fats, wherein the fat composition comprises a first fat composition containing palm oil or a palm oil fraction, the first fat composition having the following composition

(1) a glyceride composition with

- a  $S_2U$  content between 47 and 75 wt. %

- a  $SU_2 + U_3$  content < 40 wt. %

- a  $S_3$  content between 1.5 and 15 wt. %

- a diglyceride content of 3 to 12 wt. %

the glyceride contents being expressed as wt. % with respect to the total amount of di-and triglycerides

in which S means a saturated fatty acid with a hydrocarbon chain length of 16-24 carbon atoms and U means unsaturated fatty acid with a hydrocarbon chain length of 16-24 carbon atoms and

(3) and a total content of unsaturated fatty acids of less than 55 wt. %, preferably less than 50 wt. %, more preferably less than 48 wt. %,

and wherein the first fat composition is subjected to a catalytic hydrogenation until a trans fatty acid content is obtained < 13 wt. %, preferably < 10 wt. %, most preferably < 5 wt. % and an increase of C18-0 of less than 1 wt. %, preferably less than 0.7 wt. %, more preferably less than 0.4 wt. %.



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